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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,262	01/25/2002	David L. Carnahan	NANO-1	2754

7590 05/20/2004

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EXAMINER

HARRIS, ANTON B

ART UNIT PAPER NUMBER

2831

DATE MAILED: 05/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/057,262

Applicant(s)

CARNAHAN, DAVID L.

Examiner

Anton B Harris

Art Unit

2831

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12, 19, 20, 24 and 28-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 19, 20, 24 and 28-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Claims 13-18, 21-23, and 25-27 are canceled.

#### *Election/Restrictions*

2. Newly submitted claims 35-41 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 1-34 are directed to an apparatus, but claims 35-41 are directed to a method.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 35-41 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

#### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 7, 8, 28, 29, 31, and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Hung et al. (6,329,738).

Regarding claim 1, Hung et al. (col. 22, lines 25-38) discloses a nanoscale grasping device comprising:

a substrate 14 at least three electrodes 102, 104, 106, 108 on said substrate 14, and at least three elongate electrically conductive grasping elements 92, 94, 96, 98 each having first and second opposite ends with said first ends attached to and making electrical connections with said electrodes 102, 104, 106, 108 and said second ends projecting outwardly away from said substrate 14, whereby said second ends are free to be attracted or repelled electrostatically in response to application of voltages to said electrodes 102, 104, 106, 108.

Regarding claim 7, Hung et al. (col. 22, lines 25-38) discloses at least four electrodes 102, 104, 106, 108 on said substrate 14, and at least four grasping elements 92, 94, 96, 98 having their first ends attached to and making electrical connections with different ones of said at least four electrodes 102, 104, 106, 108, whereby said second ends of grasping elements 92, 94, 96, 98 move toward and away from one another by electrostatic forces in response to voltages applied to said at least four electrodes 102, 104, 106, 108.

Regarding claim 8, Hung et al. (col. 22, lines 25-38) discloses four electrodes 102, 104, 106, 108 and four grasping elements 92, 94, 96, 98, with said four electrodes 102, 104, 106, 108 arranged in a rectangular pattern on said substrate 14.

Regarding claims 28 and 29, Hung et al. (col. 22, lines 25-38) discloses at least one grasping element 92, 94, 96, 98.

Regarding claim 31, Hung et al. (col. 22, lines 25-38) discloses a nanoscale grasping device comprising:

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a substrate 14, three elongate, fibrous, electrically conductive grasping elements 92, 94, 96, 98 projecting outwardly from said substrate 14, and three electrodes 102, 104, 106, 108 on said substrate 14.

Regarding claim 34, Hung et al. (col. 22, lines 25-38) discloses a nanoscale grasping device consisting of:

a substrate 14, three or more fibrous electrically conductive grasping elements 92, 94, 96, 98 having first ends that are fixed to separate electrodes 102, 104, 106, 108 on the substrate 14 and second free ends that are spaced from the substrate 14, each of said grasping elements 92, 94, 96, 98 being separated from each other grasping element 92, 94, 96, 98 by a gap.

### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-6, 9-12, 30, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hung et al. in view of Kim et al., (NANOTUBE NANOTWEEZERS, Dated 12/10/1999).

Regarding claim 2, Hung et al. discloses the invention substantially as claimed, but lacks grasping elements made of nanofibers.

Kim et al. (page 1, paragraph 2) teaches grasping elements made of nanofibers.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Hung et al. by providing grasping elements made of nanofibers in order to provide remarkable mechanical toughness and electrical conductivity in view of the teachings of Kim et al.

Regarding claims 3 and 32, Kim et al. (page 1, paragraph 6) teaches that grasping elements comprise a carbon nanotube.

Regarding claim 4, Kim et al. (page 1, paragraph 6) teaches a carbon nanotube integral with one of said electrodes.

Regarding claims 5 and 6, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "adapted to bind" has been considered, but does not result in a structural difference. It has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires that ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson*, 69 USPQ 138.

Regarding claim 9, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "an oscillating voltage applied to at least one of said grasping elements" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Regarding claim 10, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of "an oscillating voltage is applied to at least one of said grasping elements is in phase with the oscillating voltage applied to at least first and second ones

of grasping elements via said electrodes, with the oscillating voltage applied to said first one of said grasping elements being in phase with the oscillating voltage applied to said second one of grasping elements” has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Regarding claim 11, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of “an oscillating voltage applied to first and second ones of said grasping elements via said electrodes, wherein the oscillating applied to said first one of said grasping elements is substantially out of phase with the oscillating voltage applied to said second one of said grasping elements” has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Regarding claims 12 and 30, Kim et al. (page 1, paragraph 6) teaches grasping elements.

Furthermore, the limitation of “voltages on said electrodes so as to cancel or enhance resonant vibration of said grasping elements” has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Regarding claim 33, Kim et al. (page 1, paragraph 6) teaches that carbon nanotubes have a diameter in the range of about 20 to about 150 nm and a length in the range of about 20 to about 40 nm.

7. Claims 19, 20, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hung et al.

Regarding claim 19, Hung et al. (col. 22, lines 25-38) discloses three electrodes 102, 104, 106, 108 and three grasping elements 92, 94, 96, 98.

Furthermore, the limitation of "an oscillating voltage at each of said three electrodes with the voltage at each electrode being substantially 120 degrees out of phase with the voltage at the other electrodes" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Regarding claim 20, Hung et al. (col. 22, lines 25-38) discloses three electrodes 102, 104, 106, 108 and three grasping elements 92, 94, 96, 98.

Furthermore, the limitation of "a steady state voltage at two neighboring electrodes and different voltages at the other two electrodes" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

Regarding claim 24, Hung et al. (col. 22, lines 25-38) discloses three electrodes 102, 104, 106, 108 and three grasping elements 92, 94, 96, 98.



Furthermore, the limitation of "an oscillating voltages are applied to each of said grasping elements via said electrodes, with each oscillating voltage being substantially 90 degrees out of phase with the other oscillating voltages" has been considered, but does not result in a structural difference. The presence of process limitations in product claims, which product does not otherwise patentably distinguish over prior art, cannot impart patentability to that product. *In re Stephens*, 145 USPQ 656 (CCPA 1965).

### *Response to Arguments*

8. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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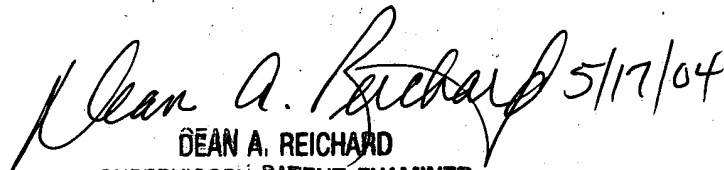
however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anton B Harris whose telephone number is (571) 272-1976. The examiner can normally be reached on weekdays from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Dean Reichard, can be reached on (571) 272-2800 ext 31. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

abh

5/17/04

 5/17/04  
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